REMARKS

Claims 16-17, 63-87, 89-103 and 131-132 are pending. Claims 16 and 63 have been amended by this response. Claim 17 has been cancelled by this response. Claims 1-15, 18-62, 88, 104-130, and 133-160 were canceled in a previous response. Reconsideration and allowance of the claims are respectfully requested in view of the amendments and the following remarks.

I. Rejection of Claims 63-87 and 89-103 Under 35 U.S.C. 112

The Examiner rejected claims 63-87 and 89-103 under 35 U.S.C. 112, first paragraph, as failing to comply with the written requirement. Specifically, the Examiner stated that the "amendment 'wherein the wafer carrier and the chamber cooperate to define a generally flat, continuous and unobstructed flow channel' is a new matter." Office Action, page 2, paragraph 3.

Furthermore, the Examiner rejected claims 63-87 and 89-103 under 35 U.S.C. 112, second paragraph, "as being indefinite to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In this case the scope of limitation 'wherein the wafer carrier and the chamber cooperate to define a generally flat, continuous and unobstructed flow channel' is indefinite since it does not point to a definite method or structure except that the outlet of gas is above the upper surface of the wafer carrier." Office Action, page 3, paragraph 5.

Independent claim 63 has been amended to recite, in part, "providing a chamber containing a wafer carrier wherein the wafer carrier and a top of the chamber cooperate to define a generally flat, continuous and unobstructed flow channel; . . . effecting generally laminar flow of gas through the flow channel intermediate the top portion of the chamber and the wafer carrier; and enhancing laminar flow from a reaction gas inlet formed generally centrally in the chamber to a ring diffuser disposed proximate a periphery of the wafer carrier . . . (emphasis added)."

It is respectfully submitted that new matter was not added by the current amendments or by the previous amendments to claim 63 made in the response filed on August 22, 2008. Support for the amendments may be found in the specification of the

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18200 Von Karman
SUITE 725
IRVINE CA 92612
(949) 752-7040
FAX (408) 392-9262

present application at least at, for example, Figure 5 and paragraph [0098], which states: "Referring now to FIG. 5, gas flow resistance can be reduced, so that a higher degree of laminar flow is produced, by forming the reaction gas outlet(s) such that they are entirely above the upper surface of the wafer carrier. By forming the gas outlet entirely above the upper surface of the wafer carrier 116, a more direct route (and thus less contorted) for the reaction gas from the gas inlet 112 to the gas outlet 119 is provided. As those skilled in the art will appreciate, the more direct and the less contorted the route of the reaction gas, the less turbulent (and more laminar) its flow will be (emphasis added)." The embodiment of FIG. 5 (as well as the embodiments of FIGS. 7 and 8) clearly shows a flat, continuous and unobstructed (i.e., a more direct, less contorted, less turbulent or more laminar) flow channel 130 of the exhaust gas flow such that flow resistance is reduced and laminar flow is substantially enhanced. Furthermore, claim 63 has been amended to clarify that the flow channel (illustrated, for example, by reference numeral 130 in the embodiment of FIG. 5), may be defined structurally by the wafer carrier and the top of the chamber. Accordingly, it is respectfully requested that the rejections of claim 63 under 35 U.S.C. 112 be withdrawn. For the same reasons, it is respectfully requested that the rejections of dependent claims 64-87 and 89-103, which depend from claim 63 also be withdrawn.

II. Rejection of Claims 16-17 and 131-132 under 35 U.S.C. 102(e) or, in the alternative, under 35 U.S.C. 103(a)--Tabata

Claims 16-17 and 131-132 were rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tabata et al (US 2003/0133854).

Tabata discloses that TEOS gas is supplied to semiconductor-treating apparatuses 501 to 503 from three different TEOS gas supply units 621 to 623 (not a common supply) (see Tabata, FIG. 2 and ¶[0067]). In addition, a separate gas from an ozone generator 31 is supplied to semiconductor-treating apparatuses 501 to 503, which are connected to the gas supply pipes 401 to 403 that are arranged in parallel and connected to the gas output pipe 35 . . ." Tabata, ¶[0066]. Furthermore, Tabata discloses using a "gas discharge pipe

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SUITE 725
IRVINE CA 92612
(949) 752-7040
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8 having the APC 81 as the gas discharge passage . . . provided in parallel with the gas supply passages 401 to 403." ¶[0068]. This is so that "Upon controlling the pressure in the gas discharge pipe 8 communicated with the conduits 401 to 403 by operating the APC81, . . . , the pressure in the conduits 401 to 403 can be suitably controlled on the side of the ozone generator 31." ¶[0070]. That is, Tabata discloses that, in addition to MFCs 411 to 413, the APC 81 is needed in the gas discharge pipe 8 to control the pressure in the conduits 401 to 403.

Tabatha fails to disclose, teach or suggest a structure as claimed in the present application, including: "A method for chemical vapor deposition comprising supplying a plurality of chambers with reactant gases from a common gas supply and individually controlling amounts of components of the reactant gases directly provided to each of the chambers with gas flow controllers independently from each other," as recited in claim 16 and substantially similar in claim 131. It is therefore respectfully requested that the rejection of independent claims 16 and 131, as well as claims 17 and 132 that depend therefrom, respectively, be withdrawn.

III. Rejection of Claims 63-67, 71-75, 78-84, 87, 89-93 and 96 under 35 U.S.C. 102(b), or in the alternative, under35 U.S.C. 103(a)--Jurgensen

Claims 63-67, 71-75, 78-84, 87, 89-93 and 96 were rejected under 35 U.S.C. 102(b) as being anticpated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Jurgensen et al. (WO 02/18672).

Jurgensen (WO 02/18672 or US Pub. 2004/0003779) fails to disclose teach or suggest, at least, "providing a chamber containing a wafer carrier wherein the wafer carrier and a top portion of the chamber cooperate to define a generally flat, continuous and unobstructed flow channel (emphasis added)," as recited in claim 63. Instead, Jurgensen discloses in Figure 1 that the gas admission element 6 is an overall two-part configuration having a core, which forms a section 49 which projects into the process chamber 1 and is frustoconical in shape. This is not indicative of a "flat, continuous and unobstructed" flow channel that would be defined between the carrier plate 3 and a top portion of the chamber because the section 49 projects into the top of the process

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chamber 1. Furthermore, Jurgensen discloses that between "the two annular plates 7 and 7' there is a passage through which the gas which has emerged through the gas outlet opening 25 is passed to an exhaust 18" (Jurgensen [0017]). Exhaust 18 is located below the carrier plate 3 as shown in FIG. 1 of Jurgensen. Therefore, Jurgensen also fails to disclose that a gas flow discharge entirely above the wafer carrier. Accordingly, it is respectfully requested that this rejection of independent claim 63 be withdrawn.

The dependent claims all depend upon amended independent claim 63. Thus, it is respectfully requested that this rejection of all of the dependent claims be withdrawn.

IV. Claim Rejections Under 35 U.S.C. 103

Hirooka in view of Maeda

Claim 16 was rejected under 35 U.S.C. 103(a) as being unpatentable over Hirooka et al (US 4798166) in view of Maeda et al (US 5281295).

Claim 16 has been amended to recite, in part, "removing gas from the chambers via a common gas exhaust system." It should be noted that this amendment to claim 16 introduces no new matter as the amendment incorporates the subject matter of claim 17, which has been canceled by this response. Hirooka and Maeda, alone or in combination, fail to disclose, teach or suggest such limitation.

Hirooka completely fails to disclose removing gas from the chambers via a common gas exhaust system. Maeda discloses that "the exhaust pipes 21a to 21e are connected to branch pipes 19a to 19e in parallel with the outlet pipes 20a to 20e, respectively. The outlet pipes 20a to 20e and the exhaust pipes 21a to 21e are provided with the needle valves 25a to 25e and the needle valves 26a to 26e, respectively. Accordingly, it is possible to control the gas flows through the outlet pipes 20a to 20e, including the gas dispersing devices 27a to 27e, to be almost equal to the gas flows through the exhaust pipes 21a to 21e, respectively." Maeda, col. 4 lines 20-29. Thus, Maeda uses switching valves for switching the flow of process gas between the outlet pipes and the exhaust pipes through first and second flow rate controllers so that it is possible to almost equalize the gas flows through the outlet pipes and processing stations with the gas flows through the exhaust pipes. This is contrary to having a "common gas

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exhaust system" as recited in claim 16 of the present application. Accordingly, it is respectfully requested that the rejection of claim 16 under 35 U.S.C. 103(a) over Hirooka in view of Maeda be withdrawn.

Jurgensen in view of Ikeda

Claims 63-87, 89-93 and 96 were rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen in view of Ikeda et al (JP 62211914).

Jurgensen and Ikeda, alone or in combination, fail to disclose teach or suggest all the elements of independent claim 63. As discussed above with respect to Jurgensen, Jurgensen fails to disclose, at least, "providing a chamber containing a wafer carrier wherein the wafer carrier and a top portion of the chamber cooperate to define a generally flat, continuous and unobstructed flow channel (emphasis added)," as recited in claim 63. Instead, Jurgensen discloses in Figure 1 that the gas admission element 6 is an overall two-part configuration having a core, which forms a section 49 which projects into the process chamber 1 and is frustoconical in shape. This is not indicative of a "flat, continuous and unobstructed" flow channel that would be defined between the carrier plate 3 and a top portion of the chamber because the section 49 projects into the process chamber 1. Furthermore, Jurgensen discloses that between "the two annular plates 7 and 7' there is a passage through which the gas which has emerged through the gas outlet opening 25 is passed to an exhaust 18" (Jurgensen [0017]). Exhaust 18 is located below the carrier plate 3 as shown in FIG. 1 of Jurgensen. Therefore, Jurgensen also fails to disclose that a gas flow discharge entirely above the wafer carrier, which enhances laminar gas flow. Ikeda fails to make up for the deficiencies of Jurgensen discusses above. Accordingly, it is respectfully requested that this rejection of independent claim 63 be withdrawn.

The dependent claims all depend upon amended independent claim 63. Thus, it is respectfully requested that this rejection of all of the dependent claims also be withdrawn.

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MACPHERSON KWOK CHEN & HEID LLP
18200 Von Karman
SUITE 725
IRVINE CA 92612
(949) 752-7040
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Jurgensen in view of MacLeish

Claims 94-95 were rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen in view of MacLeish et al (US 6113984).

Claims 94-95 depend from claim 63. For the reasons discussed above with respect to independent claim 63, Jurgensen fails to disclose teach or suggest all the elements of independent claim 63. MacLeish fails to make up for the deficiencies of Jurgensen. Therefore, it is respectfully requested that, at least for the reason of dependency, this rejection be withdrawn.

Jurgensen in view of Van de Walle and Hirooka

Claims 97-103 were rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen in view of Van de Walle et al (20020054745). Also, Claims 97-103 were rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen in view of Van de Walle and further in view of Hirooka.

Claims 97-103 depend from claim 63. For the reasons discussed above with respect to independent claim 63, Jurgensen fails to disclose teach or suggest all the elements of independent claim 63. Van de Walle and Hirooka fail to make up for the deficiencies of Jurgensen. Therefore, it is respectfully requested that, at least for the reason of dependency, this rejection be withdrawn.

General

It is respectfully submitted that none of the cited references, taken either alone or in combination with one another, either disclose or make obvious "A method for chemical vapor deposition comprising supplying a plurality of chambers with reactant gases from a common gas supply, individually controlling amounts of components of the reactant gases directly provided to each of the chambers with gas flow controllers independently from each other, and removing gas from the chambers via a common gas exhaust system," as recited in amended claim 16 and substantially in claim 131.

Moreover, it is respectfully submitted that none of the cited references, taken either alone or in combination with one another, either disclose or make obvious, at least, a method for chemical vapor deposition comprising "providing a chamber containing a wafer carrier wherein the wafer carrier and a top portion of the chamber cooperate to define a generally flat, continuous and unobstructed flow channel; . . . effecting generally

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(949) 752-7040
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laminar flow of gas through the flow channel intermediate the top portion of the chamber and the wafer carrier; and enhancing laminar flow from a reaction gas inlet formed generally centrally in the chamber to a ring diffuser disposed proximate a periphery of the wafer carrier and a ring seal, wherein the ring seal is disposed around the rotating wafer carrier to bridge the flow channel, and wherein the ring diffuser is comprised of at least one of SiC coated graphite, SiC quartz, or molybdenum," as recited in amended claim 63.

Applicant respectfully submits that the claims are allowable. One advantage of the present disclosure is the ability to scale up production via the addition of more chambers to an existing gas inlet and outlet system. More particularly, by using multiple chambers, the claimed invention eliminates the need for a larger size chamber, which is especially hard to use for GaN material growth that requires high temperature and high flow of corrosive ammonia gas. When using larger sized chambers for increased throughput in a CVD system, the process and hardware designs need to be re-established every time there is a size change. The development time is usually very long, several years. The history of GaN reactor size tells us it took about eight years for it to evolve from six wafers to twenty-one wafers throughput due to the complex process development associated with each size change. According to the claimed invention, the process does not change since the chamber size does not change. The scale up is almost unlimited. Each chamber is completely isolated without inter-communication and is independently controlled. Thus, the present disclosure provides substantial advantages over the prior art.

Furthermore, as described in the specification of the present application, gas flow resistance may be reduced and a higher degree of laminar flow through the chamber may be obtained with a more direct (and thus less contorted) and unobstructed route for a less turbulent flow.

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HEID LLP
18200 Von Karman
SUITE 725
IRVINE CA 92612
(949) 752-7040
FAX (408) 392-9262

CONCLUSION

It is respectfully submitted that all of the pending claims are in condition for immediate allowance. Reconsideration and an early allowance are therefore respectfully requested.

If the Examiner has any questions or concerns, a telephone call to the undersigned at (949) 752-7040 is welcomed and encouraged.

Certification of EFS Web Transmission

I hereby certify that this paper is being transmitted to the U.S. Patent and Trademark Office, via EFS Web Transmission, on the date shown below.

Jean F. Heuler — **February 6, 2009** Date of Signature

Respectfully submitted,

Alma P. Levy

Alma P. Levy
Attorney for Applicants
Reg. No. 43,751
Customer No. 32605

LAW OFFICES OF
MACPHERSON KWOK CHEN & HEID LLP
18200 Von Karman
SUITE 725
IRVINE CA 92612
(949) 752-7040
FAX (408) 392-9262